



Microsoft Excel Macro-based Automation of Accounts Receivables Process for Business Office

1. Background

- Business Office (BO) staff perform a 19-step task every month that involves data manipulation across multiple Microsoft Excel workbooks to generate Account Receivables management and recovery actions.
- The list of steps involved in this mundane task is summarized in Table 1

Table 1: List of steps involved

Step Number	Individual Task Step
1	Sort data by amount
2	Check Bills with negative amount - Check whether patient owes any outstanding bills
3	Open Hold File with "Complaints"
4	Sort by NRIC column
5	Vlookup "NRIC" from ATB file against hold list
6	Tag by "Hold" where there is a match
7	Open Installment file
8	Sort by NRIC column
9	Vlookup "NRIC" from ATB file against installment file
10	Tag by "Installment" where there is a match
11	Open "Medifund" file
12	Sort by NRIC column
13	Vlookup NRIC from ATB file against Medifund file
14	Tag by "Swiss" where there is a match.
15	Sort remaining bills by discharge / visit date
16	Conditional format for value < \$10 in NRIC column
17	Filter by red text
18	Copy and paste single bills (Red) into separate tab
19	Send email with excel

2. Objective

To improve staff productivity by automating the 19-step process, done manually by BO staff, using Excel Macro.

3. Methodology

- WHAT** is the approach?: We used Excel Macro to automate the 19 steps listed above.
- WHY** this approach?: Excel Macro is a powerful tool to manipulate data within a single or across multiple excel sheets in a seamless and swift manner.
- HOW** does it work?: Figure 1 depicts a screenshot of how the Macro file looks like. The user just have to enter the inputs and Click **Go** to get the output
- As illustrated in Fig. 2, we developed and tested the Macro using retrospective dataset. The robust version of Macro was then used to generate monthly numbers from July 2020 to March 2021

Figure 2: Timeline of Macro development and testing

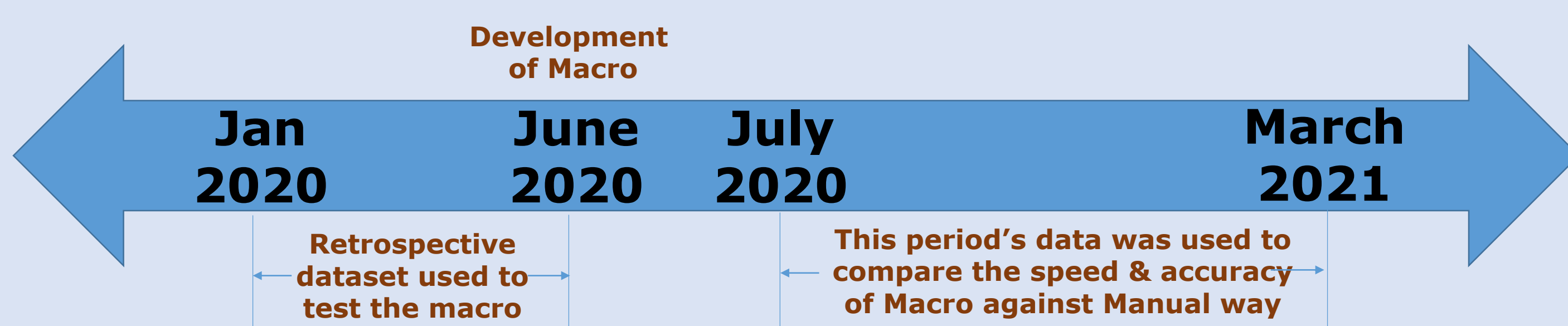
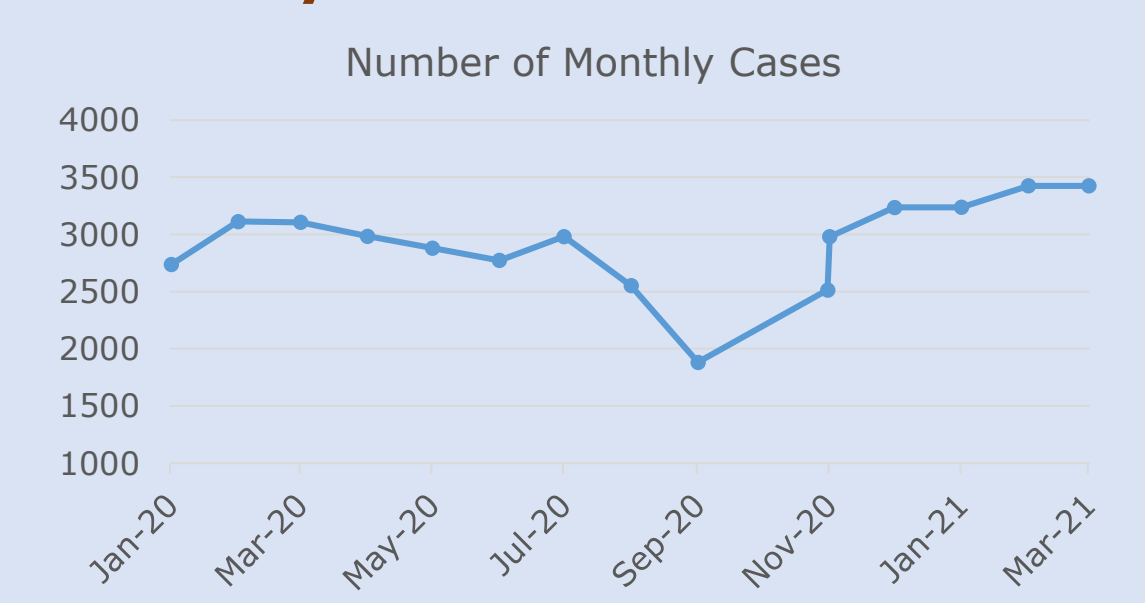


Figure 1: Screenshot of the Macro

4. Results and Discussion

- There were a total of 43,821 cases, during the period of January 2020 to March 2021, with an average of 2921 ± 299 cases monthly. Figure 3 illustrates the monthly variation of cases.
- Figure 4 clearly highlights that the Macro is significantly faster than Manual way of doing this task (31.4 minutes vs 0.5 minute).

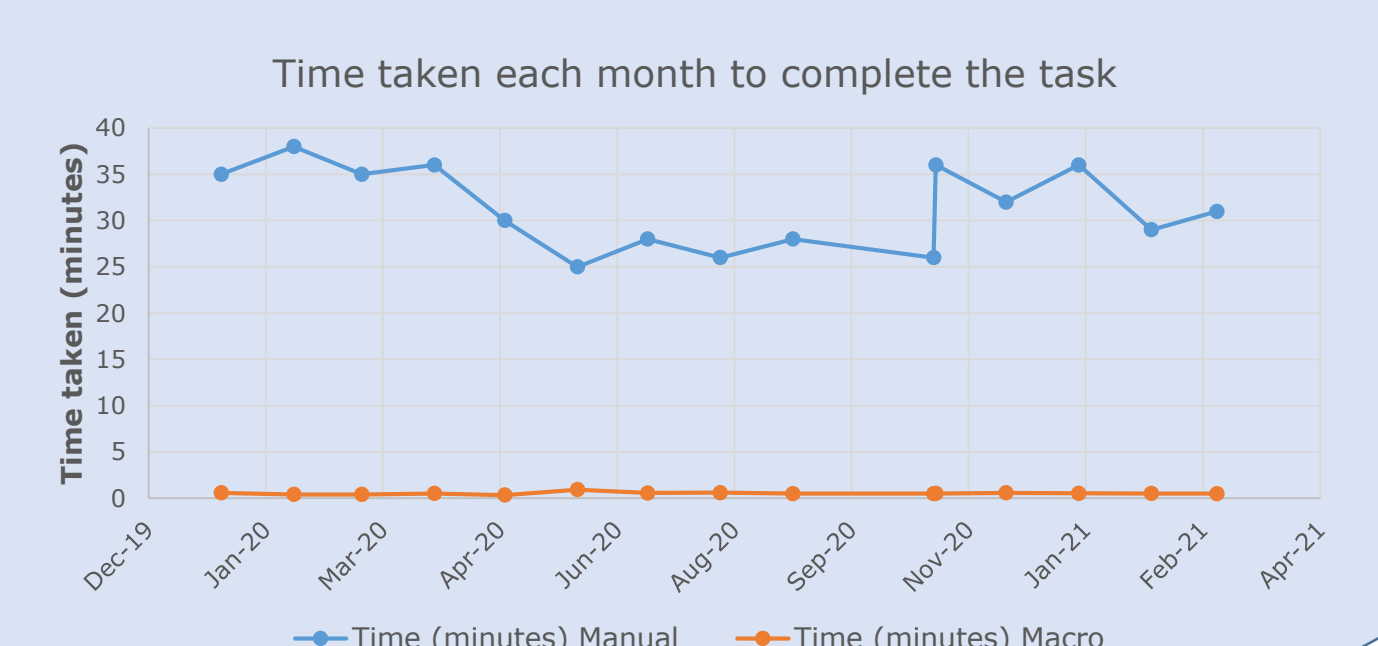
Figure 3: Monthly Count of cases from July 2020 to March 2021



PROS OF USING EXCEL MACRO

- In addition to the 30-fold timesaving, Macro also revealed errors in the manual way of generating the outstanding amounts several times.
- Since this Macro was developed in Excel, it can be easily shared across various staff in the department.

Figure 4: Time taken by Macro vs Manual way of completing the task



5. Conclusions

- Excel Macro is the most convenient and powerful way to automate data manipulations across many workbooks, as shown in this work.
- The 19-step task that BO staff take about 30 minutes to finish was completed in less than a minute by a single click using Macro.
- Given the robust results of the Macro, we plan to use this going forward instead of the BO staff accomplishing it manually.